

IN THE CLAIMS

This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A method of detecting the presence of slag in a shroud-(4) for guiding molten metal from a ladle-(2) to a tundish-(6), the method comprising:

generating, by means of at least one transmitting coil +20+, an electromagnetic field that enters the shroud and its contents;

generating an induced voltage by means of at least one receiving coil-(24) which is subjected to the electromagnetic field having entered the shroud and its contents, wherein any induced voltage having a value outside a defined voltage range is indicative of the presence of slag in said contents;

determining the flow of the molten metal passing through the shroud; and

defining said voltage range depending on the magnitude of the determined flow of molten metal.

2. (Previously Presented) The method as claimed in claim 1, further comprising:

keeping the coils substantially unmovable relative to the shroud.

3. (Currently Amended) The method as claimed in claim 1-~~or~~  
2, further comprising:

providing a forked coil holder-(10) having at least two  
branches;

mounting the transmitting coil to a first branch-(14) and  
the receiving coil to a second branch-(16) of the forked coil  
holder; and

placing the forked coil holder in such manner that an  
imagined straight line drawn between the transmitting coil and  
the receiving coil crosses the shroud.

4. (Currently Amended) The method as claimed in claim 3,  
wherein the act of placing the forked coil holder comprises  
mounting said forked coil holder to a shroud manipulator-(3).

5. (Previously Presented) The method as claimed in claim  
3, wherein the act of placing the forked coil holder comprises  
mounting said forked coil holder to a separate mounting device  
that is arranged to follow the position of the shroud.

6. (Previously Presented) The method as claimed in claim  
3, wherein the act of placing the forked coil holder comprises  
mounting said forked coil holder to a sliding gate at the  
ladle.

7. (Currently Amended) The method as claimed in claim 1-~~or~~  
2, further comprising:

providing said at least one transmitting coil in toroid form and arranging it so as to surround the shroud, and

providing said at least one receiving coil in toroid form and arranging it so as to surround the shroud.

8. (Previously Presented) The method as claimed in ~~any one of claims 1-7~~claim 1, further comprising:

detecting turbulent flow, if any, inside the shroud; and changing the frequency of the electromagnetic field generated by the transmitting coil in case of turbulent flow having been detected.

9. (Currently Amended) The method as claimed in ~~any one of claims 1-8~~claim 1, further comprising generating, by means of said at least one transmitting coil:

an electromagnetic field of alternating frequencies, or several electromagnetic fields with different frequencies.

10. (Currently Amended) The method as claimed in ~~any one of claims 1-9~~claim 1, further comprising:

defining a larger voltage range if it is determined that the magnitude of the flow of molten metal has decreased.

11. (Currently Amended) The method as claimed in ~~any one of~~  
~~claims 1-10~~claim 1, wherein the act of determining the flow of  
molten metal passing through the shroud comprises:

providing feedback from an opening position signal of a  
sliding gate at the ladle and calculating the flow of molten  
metal from the sliding gate opening information.

12. (Currently Amended) The method as claimed in ~~any one of~~  
~~claims 1-10~~claim 1, wherein the act of determining the flow of  
molten metal passing through the shroud comprises:

measuring the rate of decrease in weight of the ladle  
content and calculating the flow of molten metal from said  
measured rate of decrease in weight.

13. (Currently Amended) The method as claimed in ~~any one of~~  
~~claims 1-10~~claim 1, wherein the act of determining the flow of  
molten metal passing through the shroud comprises:

measuring the teeming rate in the tundish and calculating  
the flow of molten metal from said measured teeming rate.

14. (Currently Amended) The method as claimed in ~~any one of~~  
~~claims 1-13~~claim 1, further comprising:

cooling said transmitting and receiving coils.

15. (Currently Amended) A device for detecting the presence of slag in a shroud-(4) for guiding molten metal from a ladle -(2) to a tundish-(6), comprising:

at least one transmitting coil-(20) for generating an electromagnetic field to be entered into the shroud and its contents;

at least one receiving coil-(24) for receiving the electromagnetic field that has entered the shroud and its contents, and for generating an induced voltage, wherein any induced voltage having a value outside a defined voltage range is indicative of the presence of slag in said contents;

means for determining the flow of the molten metal passing through the shroud; and

means-(52) for defining said voltage range depending on the magnitude of the measured flow.

16. (Previously Presented) The device as claimed in claim 15, further comprising a coil holder arrangement which is mountable in such manner that the coils are enabled to substantially follow positional variations of the shroud.

17. (Currently Amended) A device as claimed in claim 16, wherein said coil holder arrangement comprises a forked coil holder-(10) having at least two branches, a first branch-(14) carrying the at least one transmitting coil(s) and a second branch-(16) carrying the at least one receiving coil(s), the

two branches being placeable in such manner that the shroud is located between them.

18. (Currently Amended) The device as claimed in claim 17, wherein the forked coil holder is adapted to be mounted to a shroud manipulator—{30}.

19. (Previously Presented) The device as claimed in claim 17, wherein the forked coil holder is adapted to be mounted to a separate mounting device which is arranged to follow the position of the shroud.

20. (Previously Presented) The device as claimed in claim 17, wherein the forked coil holder is adapted to be mounted to a sliding gate at the ladle.

21. (Currently Amended) The device as claimed in ~~any one of claims 17-20~~claim 17, wherein said two branches are electrically isolated from each other.

22. (Currently Amended) The device as claimed in claim 15-~~or 16~~, wherein said coils are in the form of toroids, wherein said coil holder arrangement is adapted to hold each toroid in such manner that it surrounds the shroud.

23. (Currently Amended) The device as claimed in ~~any one of~~

~~claims 15-22~~claim 15, wherein said means for determining the flow of the molten metal passing through the shroud comprises:

a sensor for sensing an opening position signal of a sliding gate at the ladle, and  
a processor for calculating the flow of molten metal from the sliding gate opening information.

24. (Currently Amended) The device as claimed in ~~any one of~~  
~~claims 15-22~~claim 15, wherein said means for determining the flow of the molten metal passing through the shroud comprises:

a measuring device for measuring the rate of decrease in weight of the ladle content, and  
a processor for calculating the flow of molten metal from said measured rate of decrease in weight.

25. (Currently Amended) The device as claimed in ~~any one of~~  
~~claims 15-22~~claim 15, wherein said means for determining the flow of the molten metal passing through the shroud comprises:

a measuring device for measuring the teeming rate in the tundish, and  
a processor for calculating the flow of molten metal from said measured teeming rate.

26. (Currently Amended) The device as claimed in ~~any one of~~  
~~claims 15-25~~claim 15, wherein the transmitting and receiving coils are provided with directional elements, such as a core,

for directing the electromagnetic field towards and from the shroud.

27. (Currently Amended) A casting plant, comprising:
- a ladle-(2) adapted to contain molten metal;
  - a tundish-(6) adapted to receive molten metal from the ladle;
  - a shroud-(4) arranged between the ladle and the tundish, wherein molten metal is enabled to pass from the ladle, through the shroud, and to the tundish; and
  - a device as claimed in ~~any one of claims 15-26~~claim 15.